PARAHO DEVELOPMENT CORPORATION
FOR THE GOOD OF MANKIND

December 10, 1982

D. W. Hedberg
Division of Oil, Gas, and Mining
4241 State Office Building
Salt Lake City, UT 84114

Dear Mr. Hedberg:

Paraho appreciates your prompt response to the ACR submittal of October 27, 1982. The areas the Division has listed as needing further clarification (J. W. Smith, Jr. letter to H. Pforzheimer, Jr., December 3, 1982), are addressed (Enclosure) as:

Hydrology
Revegetation
Bonding
Soils
Miscellaneous

We sincerely hope that the Enclosure will enable Division to finalize the processing of the permit application and prepare an Executive Summary to be presented before the Board of Oil, Gas and Mining.

Sincerely,

R. N. Heistand
Vice President of
Environmental Affairs

RH:ks

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Response to DOBM comments:

HYDROLOGY

Rule M-3(a)(e)

A 1:2400-scale map (1'=200") depicting the various hydrologic conveyance structures is not currently available. A map of approximately 1:6850 (1"=570") is submitted (Figures 1 & 2) which shows the structures more clearly than the earlier submission.

The map (Fig. 2) has been amended to show the general flow of surface runoff from disturbed areas, including areas 18, 21, 40, 44, 47, 48 and 49, as requested.

Runoff and erosion from the compacted outslopes of the surface facilities pads will be controlled by early revegetation attempts, terracing, or rock rip-rap coverage, as appropriate. Seeding and mulching will initially be implemented, supplemented where necessary by spreads of jute matting, transplanting of container-grown plant stock, and/or soil fertilization to aid in establishing vegetation. Slopes having significant erosion potential may be controlled by engineered structures such as swales or terraces. Outslopes within the main plant area with lower revegetation potential (see for example southwest facing slopes between areas 31-13, 10-11, etc., on Figure 2) may be covered with a shallow rock rip-rap facing to minimize erosion but which will also allow for plant growth.

During construction of plant facilities, two temporary sediment control basins will be installed to receive and prevent discharge of sediment laden runoff. The location of the basins is shown on Figure 2.

As requested by the Division cross-sections requested for the proposed sedimentation ponds will be provided to the Division at least 60 days prior to actual field construction, as requested by the Division.

As requested by the Division, the final hydrologic design calculations, assumptions and input factors that will be utilized in development of the final construction designs for the runoff control systems will be also provided to the Division at least 60 days prior to field construction. Such designs will include a description of how maximum sediment storage levels will be indicated and when the sediment will be removed.

WATER SUPPLY

The location and design details of the water intake structure have been completed for various permit application submittals. Right-of-Way application (see Attachment 1) describes the water intake structure, the location of the pipeline and transmission corridor, and the size and location of the water storage pond. The 404 permit application details the water intake structure; the Application to Appropriate Water provides additional information concerning all water impoundment structures on site. These applications are being prepared for submittal to the appropriate agencies by December 15, 1982; final copies will be provided to the Division. Also a description of all wastewater impoundments will be included in the Application for a Permit to Construct A Wastewater Treatment and Disposal Facility to be submitted December 29, 1982.

The reclamation of the corridors and other areas disturbed during construction of the water supply system will include recontouring of the disturbed areas, followed by broadcast seeding. Raking or dragging may be applied to cover seeds with soil, fertilizer and/or mulch may be applied to enhance seed germination and growth of seedlings. It is anticipated that the impoundment structure would be reclaimed, recontoured, and revegetated. Revegetation of the impoundment will follow the final reclamation plan for the project facility.

A field visit to site the impoundment was completed on October 26, 1982 (see Attachment 2).

REVEGETATION

Rule M-3(2)(e)-SL

The final reclamation/revegetation practices for the retorted shale disposal area, shale fines storage area, and general plant site are basically the same (L K Limbach letter to D W Hedberg, November 29, 1982). Recontouring and surficial soil placement over the disturbed areas will preceed reveqetation. Results from the revegetation test plot would utilized in determining the final revegetation procedures.

Results from the test plot will be submitted to the Division on a yearly basis. The Division's condition that a final revegetation plan be submitted to the Division at least 60 days prior to permanent revegetation is suitable to Paraho.

Monitoring information concerning threatened, endangered or sensitive plant species will also be supplied to the Division in an annual report.

BONDING

As requested November 22, 1982 (R N Heistand, letter to D W Hedberg), Paraho's entire application should be recommended for approval and that bonding should be established by phases. Detailed descriptions of the activities, schedule, and anticipated reclamation costs of each phase will be supplied to the Division approximately 90 days prior to the commencement of each phase. In addition, Paraho proposes to provide suitable assurance of the agreed reclamation costs to the Division approximately 30 days prior to the commencement of any field work for that phase.

For the first phase, Site Development, presently scheduled to begin mid-year 1983 and last throughout the remainder of the year, the reclamation tasks, type of work and anticipated costs would be:

1.	Mine closure	sealing adit and reclaiming portal and access road	$25,000
2.	Foundations/ paving	breaking up and burying of foundation/paving materials	875,000
3.	Soils/ revegetation	replacing soils on all disturbed areas and reveg- etating (322 acres)	1,546,000
4.	Monitoring	monitoring results of above tasks for at least three years to assure reclama- tion is complete.	40,000
TOTAL			$2,486,000

SOILS REMOVAL

On the basis of recent discussions with UDOGM, Paraho proposes to perform additional detailed soils surveys and to provide the results to UDOGM approximately 60 days prior to commencing field construction activities, the following:

-soils mapped by series
-soils depth to be removed (according to soil series) relative to the mapped areas
-soils data on alluvial soils
-a complete, upgraded soil tabulation chart

SOIL STORAGE - Seed Mix

The surficial soils will be revegetated before results from the test plots are finalized. The anticipated seed mix is:

	lbs/acre
Utah sweetvetch	6
Winterfat	8
Russian wildrye	8
Kochia prostrata	6
Atriplex canescens	12
Yellow sweet clover	6
	40 lbs/acre

It is anticipated that mulch (straw or hydromulching) will be applied at the rate of 1500 lb/acre. It is not anticipated that other surface stabilizing agents will be used.

SOIL STORAGE - Soils Cross-Sections

Three additional cross-sections are submitted which depict the lateral profiles of the surficial soil stockpiles. The additional cross-sections are at the same scale (1" = 200') as the previously submitted longitudinal profiles, and generally intersect the stockpiles through their greatest thickness. Lines of section for the earlier and the additional cross-sections are shown on Figures 3 and 4. Figure 5 shows the additional lateral profiles of the surficial soils stockpiles.

SOILS STORAGE/DISTRIBUTION

Rock Rip-Rap

At the retorted shale disposal site, a sufficiently thick rock rip-rap layer is used to prevent freeze-thaw erosion. Slopes are designed to blend with the naturally-occurring slopes. The area planned for rock rip-rap facing is not significantly different from the area of steep-walled side canyons that will be covered by the retorted shale disposal site.

The use of rock rip-rap on surficial soils storage piles will be much less. First, the soils piles are not designed for long-term storage; present plans suggest a maximum storage period of seven to ten years. Second, the amount of soils to be stored is not so great as to create steep embankments. Third, only the "downstream" or southerly faces will be protected by a shallow (approximately six inches deep) rip-rap facing to reduce erosion from water runoff. The rock rip-rap on the single side will not be so deep as to prevent plant growth. Thus, biological activity of these soils will not be seriously impacted.

The average depth of stockpiled soils ranges from 25 feet to 90 feet for the three piles planned for the site. Although this short term (less than ten years) storage, will result in dormancy of the beneficial microbes, conditions are not so severe that biological activity cannot be restored during reclamation. (see attached technical memo from J. Clay to R. Heistand, 12/10/82).

Although a gentle slope is another means of preventing erosion and some studies indicate that the slope should be 1:10, this would require nearly ten-fold the land area for surficial soils stockpiles. The limited land area of the project site requires that stockpiles cover smaller areas.

Since the ratio of rock-to-soil would be small, there should be no need to segregate these materials before redistribution. The amount of rocks in the surficial layer would not be significantly different from that now existing on-site.

Reclamation

Final reclamation (seeding and planting) will be conducted in the fall season unless otherwise approved by the Division.

Soils Redistribution

If there is an excess of topsoil, it will not be excessive. It will be utilized by (1) either replacing soil cover on exposed areas to somewhat greater depths, or (2) leaving soil in the stockpile area and recontouring before reclamation.

The experimental design of the test plot will be provided to the Division as the Division requested, approximately 120 days before the experimental work is scheduled.
This will enable the Division to review the design of the test plot prior to commencing the field work. It is Paraho's present intentions, as part of that test plot, to study the effectiveness of a capillary barrier layer. Part of the planned experimental work on the test plot also includes periodic reviews and reports of the test results which will be sent to the Division.

Soils Redistribution, continued

The rock to be removed from the proposed diversion cut exists at, or within a hundred feet of the surface. As such, it is expected that this material will differ from the dolomitic minerals, known to be alkaline or saline, that exist about 600 feet underground. Even so, all rock scheduled to be used for roadbed, mine bench, or rip-rap will be tested for pH and EC to assure that background levels of salinity and alkalinity are not exceeded in anticipated runoff. Details of soils and rock sampling, as well as the analysis of surface water will be addressed in depth in Paraho's Environmental Monitoring Plan that will be reviewed by several agencies including the Utah Division of Environmental Health. This Plan will be approved before the start of operations.

MISCELLANEOUS

The terms of negotiations and agreements with Wesco, Mountain Fuel, and other owners of lease allotments, or easements on the Paraho site will be provided to the Division. Discussions have been initiated; completion of final agreements will be reached before the commencement of mining operations.

Normal pillar sizes, planned for the underground mine are designed from about 60 feet by 60 feet, to as large as 85 feet by 85 feet. Since directional probes permit gas drillers to determine bit location within 10 feet, a well-designed drilling operation coupled with a well-designed mine survey would allow a gas well to be placed within about 30 feet from the edge of pillars. This should be adequate for future gas drilling.

The socio-economic clearances, the Financial Alleviation and Impact Mitigation Plan, required by Utah S.B. 170 is not a permit and does not require formal approval. However, this Plan is being prepared by Paraho with the cooperation of the Uintah County Commissioners and the Utah Department of Community and Economic Development.

It is anticipated that there will be appropriate Plan by the end of 1982.

TECHNICAL MEMO

TO: R. N. Heistand

FROM: J. Clay, VTN

DATE: December 10, 1982

SUBJECT: Biological Activity of Soil Storage

Surficial soil will be stored for a maximum of seven to ten years, which varies from three years storage to a maximum of ten years of storage.

It is recognized that biological activity will decrease over time and that there is little biological activity below a three foot depth in soils. However, most important, soil microorganisms can tolerate long term dormancy, particularly under the arid and slightly alkaline conditions found in the soils of the Paraho-Ute project site.

Conditions on site are not such that soils will become sterilized. As microorganisms consume available organic matter heterotrophic populations will decrease, and minerotrophs will increase relatively. All microorganisms important in soil biological activity are capable of forming relatively resistant long-term reproductive structures. Actinomycetes form conidia which have a long term viability; bacteria may form encysted reproductive structure which are also long-lived; and species of fungi can form thick-walled spores. (Alexander 1977.)

As soils from stockpiles are used, surficial biologically active layers may be mixed with deeper soils, resulting in biologic inoculation of deeply buried soils. Additionally, once buried soils are aerated and exposed to sunlight, and organic matter, in the form of plant material is introduced, active populations of the various soil microoganisms are expected to increase.

It would be preferable to store stockpiles in a manner which minimizes soil depths. Project land area constraints will not allow a redesign of the soil stockpiles. Decreases in biologic activity are a legitimate concern under the circumstances; but the activity should be effectively mitigated by the relatively short storage time planned for the stockpiled soils.

Reference: Alexander, M. 1977. Introduction to Soil Microbiology John Wiley & Sons, N.Y.

LEGEND

Supplement to Figures 1 and 2

1. Mine Conveyor Drive House
2. Mine Conveyor
3. Mine Surge Bin
4. Emergency Raw Shale Storage
5. Crushing and Screening Station
6. Central Control Room and Lab
7. Conveyor Junction Houses
8. Prepared Shale Covered Storage
9. Distribution Bin
10. Screening Station
11. Sampling and Weighing Houses
12. Retorts
13. Oil Recovery
14. Compressor Houses
15. Gas Cleaning
16. Power Generation
17. Oil Coolers
18. Tank Farm
19. Hydrotreater
20. Sanitary Wastewater Treatment
21. Firewater Pond
22. Equalization Basin
23. Process Wastewater Treatment
24. Retention Pond
25. Thickener/Digester
26. Air Compressor, Plant Steam, and Inert Gas
27. Storage Yard
28. Receiving and Storage Room
29. Administration and Change House
30. Parking Area
31. Sub Stations
32. Temp. Raw Shale Storage (Mine Devel.)
33. Retorted Shale
34. Raw Shale Fines Storage
35. Flares
36. Mine Surface Facilities
37. Retorted Shale Disposal Conveyor
38. Fuel Oil Storage
39. Vertical Shaft (Main Access)
40. Mine Entrance and Vent Fans
41. Power Line
42. Maintenance Shops
43. Gatehouse
44. River Water Treatment
45. Retorted Shale Disposal Hopper
46. Surficial Soil Storage Area
47. Product Oil Pipeline Pumping Station
48. ANFO Mixing Plant and Magazine
49. Ammonia Storage
50. Sulfur Storage
51. Liquid Propane Receiving and Storage
52. Waste Rock Storage